

Application No. 10/028,839  
Paper Dated: March 26, 2004  
In Reply to USPTO Correspondence of January 5, 2004  
PPG Case No. 1716A1

### **AMENDMENTS TO THE CLAIMS**

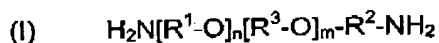
The listing of the claims will replace all prior versions and listings of claims in the present application. Please cancel claims 8, 14, 15, and 19, and amend claims 1, 11, and 16 as indicated below in the listing of claims.

#### **Listing of Claims**

1. (currently amended) A reaction product comprising polyether carbamate groups, said reaction product formed from:

(A) at least one polyoxyalkylene amine selected from the group consisting of polyoxyalkylene ~~monoamine~~, polyoxyalkylene diamine, polyoxyalkylene triamine, and mixtures thereof,

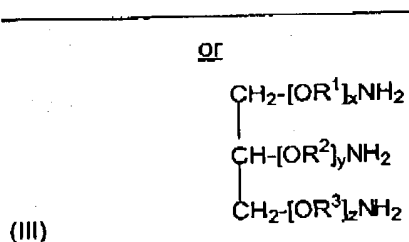
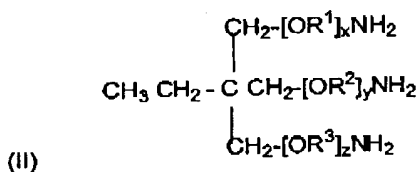
wherein the polyoxyalkylene diamine comprises a compound having the following structure (I):



where  $R^1$ ,  $R^2$ , and  $R^3$  can be the same or different and each independently represent a  $C_2$  to  $C_{12}$  alkylene group, and  $(n + m)$  represents a value greater than 2, provided that when  $R^1$  and  $R^3$  are different  $(n + m)$  represents a value greater than or equal to 2,

wherein the polyoxyalkylene triamine comprises a triamine having the following structure (II) or (III):

Application No. 10/028,839  
 Paper Dated: March 26, 2004  
 In Reply to USPTO Correspondence of January 5, 2004  
 PPG Case No. 1716A1



wherein  $R^1$ ,  $R^2$ , and  $R^3$  independently can be the same or different and each independently represents a moiety selected from ethylene, propylene, and butylene, and  $x$ ,  $y$ , and  $z$  independently can be the same or different, and each independently represents a value greater than or equal to 1; and

(B) at least one cyclic carbonate,

wherein a ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.5 to 1:1.5.

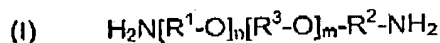
2. (original) The reaction product of claim 1, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.8 to 1:1.1.

3. (original) The reaction product of claim 1, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.9 to 1:1.1.

Application No. 10/028,839  
Paper Dated: March 26, 2004  
In Reply to USPTO Correspondence of January 5, 2004  
PPG Case No. 1716A1

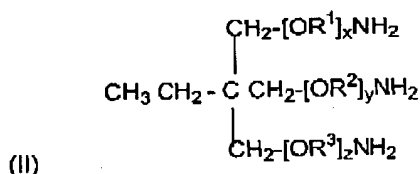
4. (original) The reaction product of claim 1, wherein at least a portion of the reaction product is hydroxy-terminated.
5. (original) The reaction product of claim 1, wherein  $R^1$ ,  $R^2$ , and  $R^3$  can be the same or different and each independently represents an alkylene group selected from ethylene, propylene, and butylene; and  $(n + m)$  represents a value greater than 2, provided that when  $R^1$  and  $R^3$  are different,  $(n + m)$  is equal to or greater than 2.
6. (original) The reaction product of claim 1, wherein  $R^1$ ,  $R^2$ , and  $R^3$  can be the same or different and each independently represents an alkylene group selected from ethylene and propylene, and  $(n + m)$  represents a value greater than 2, provided that when  $R^1$  and  $R^3$  are different,  $(n + m)$  is equal to or greater than 2.
7. (original) The reaction product of claim 6, wherein  $5 \leq (n + m) \leq 6$ .
8. (canceled)
9. (original) The reaction product of claim 1, wherein the cyclic carbonate is selected from the group consisting of ethylene carbonate, propylene carbonate, butylene carbonate, glycerine carbonate, and mixtures thereof.
10. (original) The reaction product of claim 9 wherein the cyclic carbonate is selected from at least one of ethylene carbonate, propylene carbonate, and butylene carbonate.
11. (currently amended) A reaction product comprising polyether carbamate groups, said reaction product formed from :
  - (A) at least one polyoxyalkylene amine selected from the group consisting of polyoxyalkylene diamine, polyoxyalkylene triamine, and mixtures thereof,  
wherein the polyoxyalkylene diamine comprises a compound having the following structure (I):

Application No. 10/028,839  
 Paper Dated: March 26, 2004  
 In Reply to USPTO Correspondence of January 5, 2004  
 PPG Case No. 1716A1

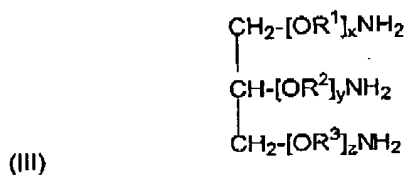


where  $R^1$ ,  $R^2$ , and  $R^3$  can be the same or different and each independently represent a  $C_2$  to  $C_{12}$  alkylene group, and  $(n + m)$  represents a value greater than 2, provided that when  $R^1$  and  $R^3$  are different  $(n + m)$  represents a value greater than or equal to 2,

wherein the polyoxyalkylene triamine comprises a triamine having the following structure (II) or (III):



or



wherein  $R^1$ ,  $R^2$ , and  $R^3$  independently can be the same or different and each independently represents a moiety selected from ethylene, propylene, and butylene, and  $x$ ,  $y$ , and  $z$  independently can be the same or different, and each independently represents a value greater than or equal to 1; and

Application No. 10/028,839  
 Paper Dated: March 26, 2004  
 In Reply to USPTO Correspondence of January 5, 2004  
 PPG Case No. 1716A1

(B) at least one cyclic carbonate selected from propylene carbonate, butylene carbonate, glycerine carbonate, and mixtures thereof, wherein a ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.5 to 1:1.5.

12. (original) The reaction product of claim 11, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.8 to 1:1.1

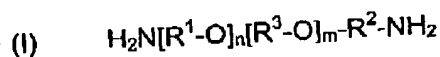
13. (original) The reaction product of claim 11, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.9 to 1:1.1.

14. (canceled)

15. (canceled)

16. (currently amended) A reaction product prepared by the following steps:

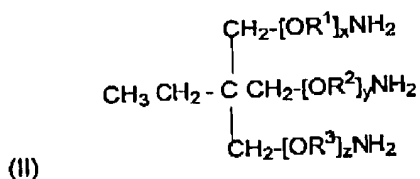
(a) admixing at least one cyclic carbonate, and at least one polyether amine selected from the group consisting of polyoxyalkylene monoamine, polyoxyalkylene diamine, polyoxyalkylene triamine, and mixtures thereof, wherein the polyoxyalkylene diamine comprises a compound having the following structure (I):



where  $R^1$ ,  $R^2$ , and  $R^3$  can be the same or different and each independently represent a  $C_2$  to  $C_{12}$  alkylene group, and  $(n + m)$  represents a value greater than 2, provided that when  $R^1$  and  $R^3$  are different  $(n + m)$  represents a value greater than or equal to 2,

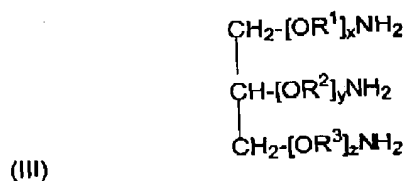
wherein the polyoxyalkylene triamine comprises a triamine having the following structure (II) or (III):

Application No. 10/028,839  
 Paper Dated: March 26, 2004  
 In Reply to USPTO Correspondence of January 6, 2004  
 PPG Case No. 1716A1




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or



wherein  $R^1$ ,  $R^2$ , and  $R^3$  independently can be the same or different and each independently represents a moiety selected from ethylene, propylene, and butylene, and  $x$ ,  $y$ , and  $z$  independently can be the same or different, and each independently represents a value greater than or equal to 1; optionally, in the presence of an alkoxide catalyst, to form a reaction mixture such that the ratio of equivalents of amine to equivalents of cyclic carbonate is 1:0.5 to 1:1.5; and

(b) maintaining the reaction mixture of step (a) at a temperature ranging from ambient temperature to 150°C at atmospheric pressure for a period of time sufficient to drive the reaction to 80 percent of theoretical completion.

17. (original) The reaction product of claim 16, wherein the ratio of equivalents of amine to equivalents of cyclic carbonate ranges from 1:0.8 to 1:1.1.

Application No. 10/028,839  
Paper Dated: March 26, 2004  
In Reply to USPTO Correspondence of January 5, 2004  
PPG Case No. 1716A1

18. (original) The reaction product of claim 16, wherein the temperature of the reaction admixture is maintained between ambient temperature and 150°C at atmospheric pressure for a period of time sufficient to drive the reaction to 90 percent of theoretical completion.

19. (canceled)

20. (original) The reaction product of claim 16, wherein the cyclic carbonate is selected from the group consisting of ethylene carbonate, propylene carbonate, butylene carbonate, glycerine carbonate, and mixtures thereof.

21. (original) The reaction product of claim 16, wherein the cyclic carbonate is selected from at least one of ethylene carbonate, propylene carbonate, and butylene carbonate.

22. -54. (withdrawn)